

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant:	Michael R. Krause et al.	Examiner:	Aaron N. Strange
Serial No.:	09/980,761	Group Art Unit:	2153
Filed:	April 15, 2002	Docket No.:	10003628-2
Title:	RELIABLE MULTI-UNICAST		

REPLY BRIEF TO EXAMINER'S ANSWER

Mail Stop Appeal Brief – Patents

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This Reply Brief is presented in response to the Examiner's Answer mailed November 27, 2007, and in support of the Notice of Appeal filed September 5, 2006, the Appeal Brief filed November 6, 2006, and the Response to Non-Compliant Appeal Brief filed February 22, 2007, appealing the rejection of claims 1-47 of the above-identified application as set forth in the Final Office Action mailed June 5, 2006.

At any time during the pendency of this application, please charge any fees required or credit any overpayment due to Deposit Account No. 08-2025 pursuant to 37 C.F.R. 1.25. Additionally, please charge any fees required to Deposit Account No. 08-2025 under 37 C.F.R. 1.16, 1.17, 1.19, 1.20 and 1.21.

Appellant respectfully requests reconsideration and reversal of the Examiner's rejection of pending claims 1-47.

ARGUMENT

I. The Applicable Law

In light of *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727 [82 USPQ2d 1385] (2007), Appellant provides the following updated applicable law.

With regard to a 35 U.S.C. § 103 obviousness rejection: “Patent examiners carry the responsibility of making sure that the standard of patentability enunciated by the Supreme Court and by the Congress is applied in each and every case.” M.P.E.P. 2141 (emphasis in the original). The Examiner bears the burden under 35 U.S.C. § 103 in establishing a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074 [5 USPQ2d 1596, 1598] (Fed. Cir. 1988).

One criteria that must be satisfied to establish a *prima facie* case of obviousness is the reference or combined references must teach or suggest all of the claim limitations. *In re Royka*, 490 F.2d 981 [180 USPQ 580] (C.C.P.A. 1974).

However, “[a] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1731 [82 USPQ2d 1385, 1389] (2007). In making an obviousness determination over a combination of prior art references, it is “important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.” *Id.* at 1738 [1396].

In order to facilitate review of the determination of whether there was an apparent reason to combine known elements in the fashion claimed by the patent at issue, the “analysis should be made explicit.” *Id.* at 1738 [1396]. “[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 [78 USPQ2d 1329] (Fed. Cir. 2006) (cited with approval in *KSR*, 127 S. Ct. at 1738 [82 USPQ2d at 1396])

The test for obviousness under § 103 must take into consideration the invention as a whole; that is, one must consider the particular problem solved by the combination of elements that define the invention. *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143 [227 USPQ 543, 551] (Fed. Cir. 1985). Furthermore, claims must be interpreted in light of the specification, claim language, other claims, and prosecution history. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1568 [1 USPQ2d 1593, 1597] (Fed. Cir. 1987), *cert.*

denied, 481 U.S. 1052 (1987). At the same time, a prior patent cited as a § 103 reference must be considered in its entirety, “*i.e.* as a *whole*, including portions that lead away from the invention.” *Id.* That is, the Examiner must recognize and consider not only the similarities, but also the critical differences between the claimed invention and the prior art as one of the factual inquiries pertinent to any obviousness inquiry under 35 U.S.C. § 103. *In re Bond*, 910 F.2d 831, 834 [15 USPQ2d 1566, 1568] (Fed. Cir. 1990) (emphasis added).

Furthermore, the Examiner must avoid hindsight. *Id.* “A fact finder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.” *KSR*, 127 S. Ct. at 1739 [82 USPQ2d at 1397] (citing to *Graham v. John Deere*, 383 U.S. 1 [148 USPQ 459] (1966) in warning against a temptation to read into the prior art the teachings of the invention at issue and instructing courts to guard against slipping into the use of hindsight).

“[W]hen the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious.” *KSR*, 127 S. Ct. at 1737 [82 USPQ2d at 1395] (citing to *United States v. Adams*, 383 U.S. 39, 51-52 [148 USPQ 479] (1966)).

In conclusion, an Appellant is entitled to a patent grant if a *prima facie* case of obviousness is not established. The Federal Circuit has endorsed this view in stating: “If examination at the initial stage does not produce a *prima facie* case of unpatentability, then without more the Appellant is entitled to grant of the patent.” *In re Oetiker*, 977 F.2d 1443, 1446 [24 USPQ2d 1443, 1448] (Fed. Cir. 1992).

II. Rejection of Claims 2-18, 22, 25-41, and 45 under 35 U.S.C. §103(a) as being unpatentable over the Request for Comment 793, Transmission Control Protocol (Sept. 1981) (RFC 793) reference and the P.V. Mockapetris, Analysis of Reliable Multicast Algorithms for Local Networks, ACM (1983) reference and the Block et al. U.S. Patent No. 6,192,417.

The language and arguments set forth in the Grounds of Rejection section (9) of Examiner’s Answer at pages 3-15 appear to be identical to the language and arguments set forth in the Final Office Action mailed June 5, 2006. Appellant has addressed these arguments in the Appeal Brief filed on November 6, 2006.

In the Response to Argument section (10) of Examiner’s Answer at pages 15-19, the Examiner only addresses independent apparatus claim 2. Accordingly, in this Reply Brief

Appellant addresses the Examiner's comments regarding independent claim 2. Appellant, however, notes that complete arguments for independent method claim 25 are included in the Appeal Brief.

Regarding independent claim 2, the Examiner in the Response to Argument section (10) of the Examiner's Answer at pages 15-16 attempts to rebut Appellant's argument from the Appeal Brief that the Block patent does not teach or suggest the limitations of independent claim 2 of the source endnode participating in the multicast group including "a network interface controller having a completion processing unit configured to generate a completion event to the source process in response to an indication that a predetermined percentage of destination endnodes in the multicast group have reliably received a selected amount of message data multicast from the source endnode." As presented in the argument section of the Appeal Brief, the Examiner admits that neither the RFC 793 reference nor the Mockapetris reference teach or suggest these limitations of independent claim 2.

In the Response to Argument section (10) of the Examiner's Answer at page 16, the Examiner cites and quotes the Block patent at column 16, lines 4-5, lines 8-11, and lines 18-19. These cited portions of the Block patent refer to creating and using a CCMessages object at the source node for each message to be sent. Appellant respectfully notes that the CCMessages object is an object located in the cluster communication servicer 125 as illustrated in Figure 5 of the Block patent (note that Figure 5 labels the cluster communications servicer as 126 but Figure 1 labels the cluster communication servicer as 125 and the network message servicer as 126 and the text of the Block patent consistently refers to the cluster communication servicer 125).

Figure 1 of the Block patent discloses a computer system 100 comprising a processor 110, a main memory 120, a memory controller 130, an auxiliary storage interface 140, a terminal interface 150, and a network interface 190, all interconnected via a system bus 160. As illustrated in Figure 1 and as disclosed in the corresponding text corresponding to Figure 1, the Block patent discloses a cluster topology servicer 124, a cluster communication servicer 125, and a network message servicer 126 **which are computer programs stored in main memory 120, which can be integrated with the operating system or be provided as add on applications to operating systems.** Cluster topology servicer 124 provides the functionality needed to set up and implement one or more multicast groups in a cluster. The cluster communication servicer 125 acts as both a sender of messages to other nodes

(including multicast messages to predefined groups), and a receiver of messages from other nodes. The a network message servicer 126 comprises a protocol suite for sending and receiving multicast and point to point messages as directed by cluster communication servicer 125.

Thus, **the CCMessages object of cluster communication servicer 125 is an object in a computer program stored in main memory 120.** Completely distinct from this computer program stored in main memory 120 is network interface 190 illustrated in Figure 1 of the Block patent which supports the transfer of information between computer system 100 and remote computer systems in network 195. The Block patent, at column 8, lines 44-52 states “[n]etwork interface 190 suitably includes one or more network interface adapters 193, each network interface adapter 193 typically implemented as an expansion card that can easily be added to computer systems such as computer system 100. Examples of network interface adapter 193 include Peripheral Component Interconnect (PCI) expansion cards, Industry Standard Architecture (ISA) expansion cards, proprietary adapter cards, and any types of adapters.”

Thus, it is clear in the Block patent that the network interface adapter 193, such as a PCI card, does not include the CCMessages object which is an object of a computer program stored in main memory 120. Therefore, the Block patent does not teach or suggest the limitations of independent claim 2 of a **network interface controller having** a completion processing unit configured to generate a completion event to the source process in the response to an indication that a predetermined percentage of destination endnodes in the multicast group have reliably received a selected amount of message data multicast from the source endnode.

In the Response to Argument section (10) of the Examiner’s Answer at pages 16-17, the Examiner attempts to rebut Appellant’s argument in the Appeal Brief that the RFC 793 reference does not teach or suggest the limitations in independent claim 2 of multiple end-to-end contexts, each end-to-end context having a portion storing state information at the source node and a portion storing state information at a corresponding one of the destination endnodes to ensure the reception and sequencing of message data multicast from the source endnode to the corresponding one of the destination endnodes, wherein a reliable multicast comprises a series of replicated unicasts of message data through the send work queue and

each of the end-to-end context portions at the source endnode to the receive work queue and the corresponding end-to-end context portion of each of the destination endnodes.

In the Response to Argument section (10) of the Examiner's Answer at page 17, the Examiner specifically states that the RFC 793 reference was relied upon to teach a conventional unicast end-to-end context, storing state information of both a source and a designation endnode, which ensures the reception and sequencing of message data send from the source to the designation permitting reliable datagram service between the nodes. As stated in Appeal Brief, the Examiner admitted the RFC 793 reference fails to disclose a reliable multicast to a group of destination endnodes wherein the reliable multicast comprises a series of replicated unicasts to each endnode. Accordingly, in the Response to Argument section (10) of the Examiner's Answer at page 17, the Examiner relies on the Mockapetris reference to teach reliable multicast comprising a series of replicated unicasts of message data. As to the Examiners use of these two references, Appellant respectfully notes that the Examiner must recognize and consider not only the similarities, but also the critical differences between the claimed invention and the prior art as one of the factual inquiries pertinent to any obviousness inquiry under 35 U.S.C. § 103. *In re Bond*, 910 F.2d 831, 834 [15 USPQ2d 1566, 1568] (Fed. Cir. 1990) (emphasis added). In light of this requirement of the Examiner, Appellant provides the following critical differences between the above recited limitations of independent claim 2 and the RFC 793 reference.

The RFC 793 reference teaches the **transmission control protocol (TCP) which employs a reliable connection service between two processes**. The TCP reliable connection service **requires an association of a local send buffer or queue and receive buffer or queue (i.e., queue pair (QP)) with one and only one remote QP**. In a reliable connection service **a non-sharable resource connection must be established between a source process and a destination process**. The connection establishment and clearing of the TCP reliable connection service is described in Section 2.7, beginning at page 10 of the RFC 793 reference, which states that a connection is fully specified by the pair of sockets at the ends, and the connection can be used to carry data in both directions, that is, it is full duplex. **A reliable connection service**, such as disclosed in the RFC 793 reference **requires a process to create a QP for each process which it is to communicate** with over a network.

By contrast, the distributed computer system of independent claim 2 employs **multiple end-to-end contexts, each having a portion storing state information at the**

source node and a portion storing state information at a corresponding one of the destination endnodes to ensure the reception and sequencing of message data multicast from the source endnode to the corresponding one of the destination endnodes, wherein a reliable multicast comprises a series of replicated unicasts of **message data through the send work queue and each of the end-to-end context portions at the source endnode to the receive work queue and the corresponding end-to-end context portions at each of the destination endnodes.**

The end-to-end contexts at the source endnode and the destination endnodes as recited in independent claim 2 permit multiple reliable unicast services, such as reliable datagram services, to be established between the source process and the destination processes. **The established reliable unicast services, such as reliable datagram services, are effectively connectionless as a result of the end-to-end contexts at the source endnode and the destination endnodes,** which can greatly improve scalability.

In the Response to Argument section (10) of the Examiner's Answer at pages 17-18, the Examiner attempts to rebut Appellant's argument in the Appeal Brief that the Mockapetris reference does not teach or suggest the limitations of independent claim 2 of a reliable multicast comprising a series of replicated unicasts of message data through the send work queue and each of the end-to-end context portions at the source endnode to the receive work queue and the corresponding end-to-end context portion at each of the destination endnodes. Appellant provides the following critical differences between the above recited limitations of independent claim 2 and the Mockapetris reference.

The Mockapetris reference teaches **simulation of a multicast** in a local network which **lacks any sort of one-to-many transmission capability**. In the Mockapetris reference, the sender merely transmits separate messages to each destination and receives separate acknowledgements in return. Each destination requires two transmissions, so that a multicast set of N destinations require 2 N transmissions. Each transmission is created and received by a host, so a grand total of 4 N packets are processed by all hosts. As stated in the Mockapetris reference at page 153, column 2, this simulated multicast is "usually the most expensive."

Thus, the Mockapetris simulated multicast is a straightforward **way for a local network which lacks any sort of one-to-many transmission capabilities to simulate a multicast**, but the method is "usually the most expensive" to implement.

By contrast, the distributed computer system of independent claim 2 **employs multiple end-to-end contexts**, each end-to-end context having a portion storing state information at the source node and a portion storing state information at a corresponding one of the destination endnodes to ensure the reception and sequencing of message data multicast from the source endnode to the corresponding one of the destination endnodes to ensure the reception and sequencing of message data multicast from the source endnode to the corresponding one of the destination endnodes to **provide a reliable multicast which has one-to-many transmission capability (i.e., not just a simulated expensive multicast as taught in the Mockapetris reference)** which comprises a series of replicated unicasts of message data through the send work queue and each of the end-to-end contexts portions of the source endnode to the receive work queue and the corresponding end-to-end context portion at each of the destination endnodes.

In view of the above additional remarks responding specifically to the Examiner's Answer and the remarks in the Appeal Brief, the RFC 793 reference, the Mockapetris reference, and the Block patent do not teach or suggest alone or in combination all of the limitations of the distributed computer system of independent claim 2 or all of the limitations of the method of independent claim 25.

In addition, dependent claims 3-18, and 22 further define patentably distinct independent claim 2. Dependent claims 26-41 and 45 further define patentably distinct independent claim 25. Therefore, these dependent claims are also believed to be allowable.

Therefore, Appellants respectfully request reversal of the rejection of claims 2-18, 22, 25-41, and 45 under 35 U.S.C. § 103(a) and allowance of these claims.

III. Rejection of Claims 19-21 and 42-44 under 35 U.S.C. §103(a) as being unpatentable over the RFC 793 reference and the Mockapetris reference and the Block et al. U.S. Patent No. 6,192,417, and further in view of the J.M. Aldrich (USNET post, Oct. 16, 1997) reference.

In view of the above additionally remarks responding specifically to the Examiner's Answer and the remarks in the Appeal Brief, independent claim 2 and independent claim 25 are believed to be allowable over the cited references. Dependent claims 19-21 further define patentably distinct independent claim 2 and dependent claims 42-44 further define patentably distinct independent claim 25. Therefore, these dependent claims are also believed to be allowable.

Reply Brief to Examiner's Answer

Appellant: Michael R. Krause et al.

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Title: RELIABLE MULTI-UNICAST

Therefore, Appellants respectfully request reversal of the rejection of claims 19-21 and 42-44 under 35 U.S.C. § 103(a) and allowance of these claims.

CONCLUSION

For the above reasons, Appellant respectfully submits that the art of record neither anticipates nor renders obvious the claimed invention. Thus, the claimed invention does patentably distinguish over the art of record. Appellant, therefore, respectfully submits that the above rejections are not correct and should be withdrawn, and respectfully requests that the Examiner be reversed and that all pending claims be allowed.

Any inquiry regarding this Reply Brief should be directed to either Patrick G. Billig at Telephone No. (612) 573-2003, Facsimile No. (612) 573-2005 or Kevin Hart at Telephone No. (970) 898-7057, Facsimile No. (970) 898-7247. In addition, all correspondence should continue to be directed to the following address:

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